

# Building Envelope Technology Roadmap 2020: Executive Forum

## ● AGENDA

January 26, 2000

7:00 Reception  
Opening Remarks  
History Chart

January 27, 2000

7:30 Breakfast  
8:00 Welcome  
8:45 Insights from History  
Chart  
9:30 Vision Context  
10:15 Break  
10:30 Envisioning the  
Envelope industry  
in 2020  
11:30 Expressing the Vision  
12:30 Lunch  
1:30 Strategic Needs  
3:00 Break  
3:30 Completing the  
Roadmap  
4:30 Thank you and Adjourn

## ● ROLES

- Voluntary participation from a diverse industry group will provide expertise, technical knowledge and industry support
- DOE will serve as a facilitator
- ADL will coordinate data collection and the compilation of reports

*Today \$240 billion/year is spent on energy in buildings. Someday buildings will give back to the grid.*  
-Mark Ginsberg

## ● OUTCOMES

- Define a vision for the envelope industry in the year 2020
- Identify technology, market and policy barriers and opportunities to achieve the vision
- Discuss a work plan for completion of the Technology Roadmap

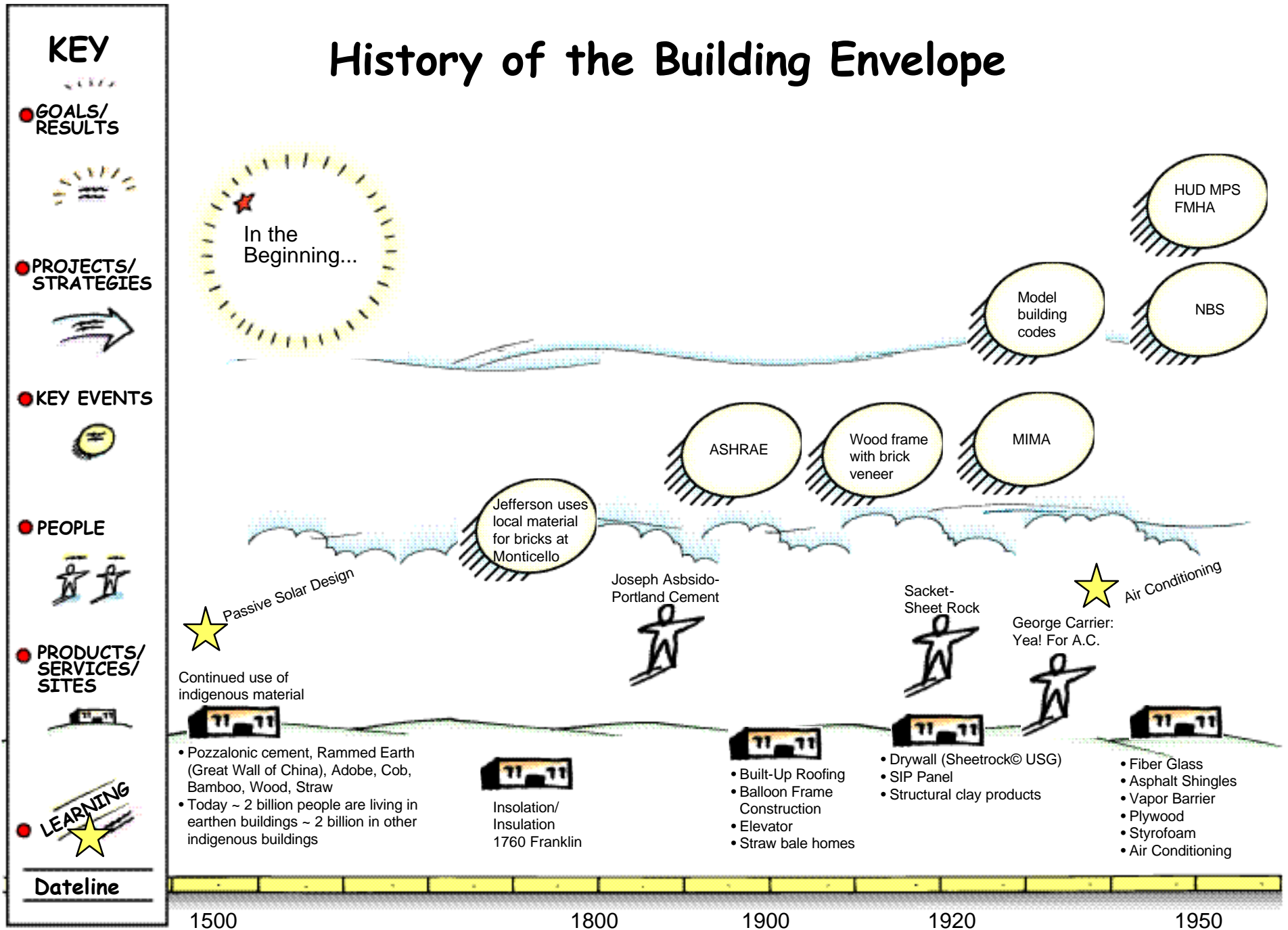


*The work that you are doing will help us meet PATH goals. Thanks for coming!*  
- Liz Burdock

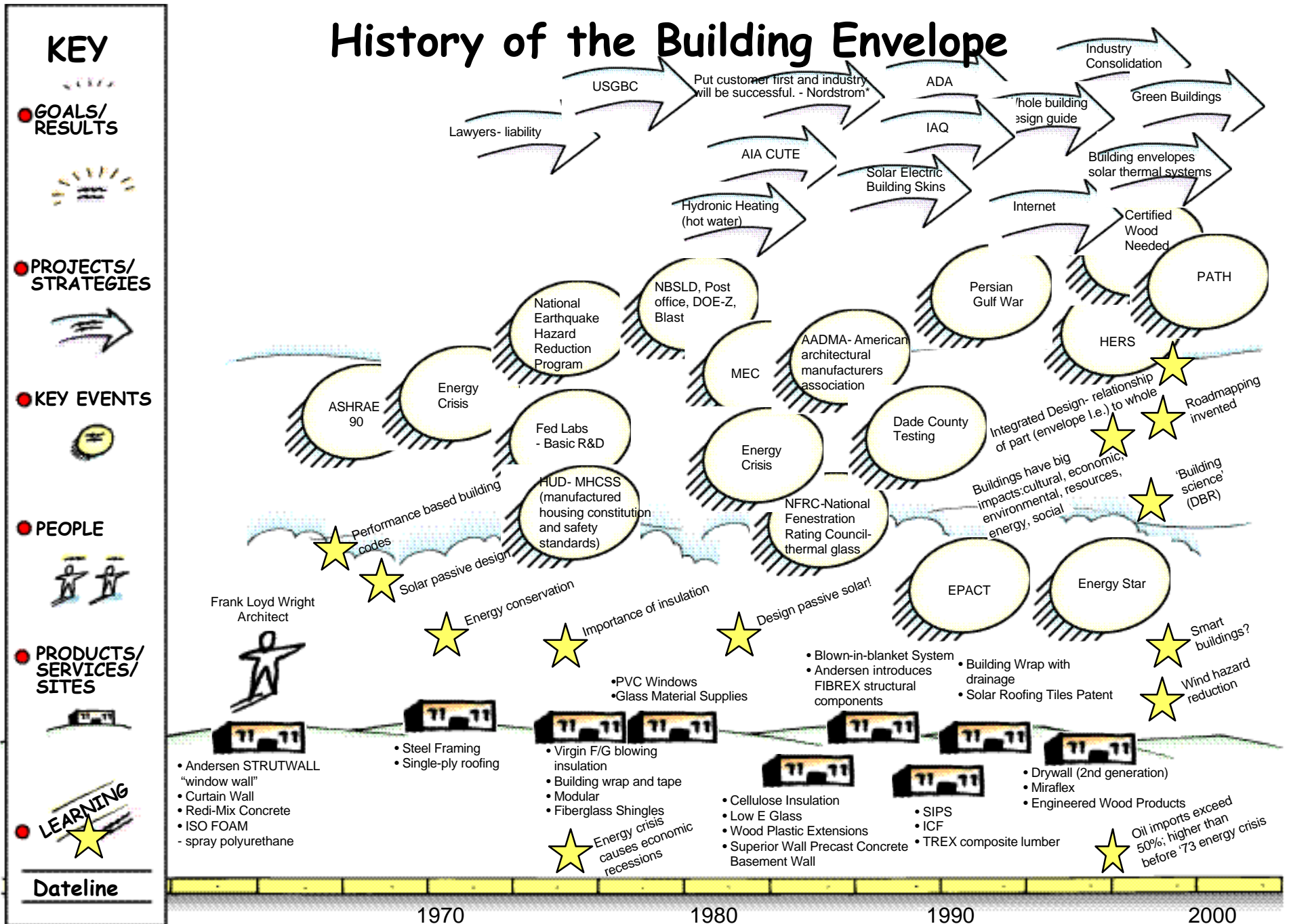
Vision Graphics Template: ©1996 The Grove Consultants International

Content: © April 2000 BETR Working Group

# History of the Building Envelope



# History of the Building Envelope





# Building Envelope Context Map

## ● SOCIAL TRENDS

- Access to information easier
- Less time less stress
- Baby-boom-echo-lite-aging boomers
- Shortage of skilled labor

- Unattractiveness of building trades
- Move toward service economy
- More mobile social
- Multi-cultural demographics

- Environmental/green concerns
- Nontraditional market growth
- Rich/poor split
- Economic strength-hurts recycling
- "Cacooning of society"

- Split education access levels
- Home-based businesses
- Desire for community
- Rebuild inner city
- Everything faster
- Zero-risk mentality

## ● TECHNOLOGY FACTORS

- Development & acceptance of building sciences discipline
- Evolution of specialty materials
- Internet effects marketing & design of envelope
- Use of AC changes moisture flows, dynamics
- Better design tools for integrated design modeling...
- Use of robotics in manufacturing process
- Micro chip replaces many expensive controls
- Systems thinking
- Internet II/ E-Business

## ● POLITICAL FACTORS

- Apathy
- Indifference to politicians
- Lessening role of federal government
- Smart growth
- Increased role of local government
- States reacting, trying to control products entering their area
- Zero risk mentality
- Varied regulatory barriers (high cost) via local control
- Urban revitalization and in-fill
- Less concern for poorest citizens

## ● ECONOMIC CLIMATE

- High disposable income
- First cost mentality
- Energy cost low as % of disposable income
- NAFTA/ globalization of the economy
- Emergence of new economies & markets abroad
- Unemployment levels low
- Interest rates
- Credit is tightening
- Builders & developers have a lot of money, land, inventory
- Builders don't need to differentiate on energy cost or energy conservation

## ● MARKET TRENDS

- Systems approach- modularity
- "De-skilling" of labor
- Larger homes- higher ceilings
- Big box distribution- installed sales

- Single people buying homes
- Cathedral ceilings change construction practices
- Selling process needs to change- info overload- shortness of time for decision making
- consolidation/market conglomerates

- Division among specialties in trades/labor
- Insurance cost influencing products/practices/standards/codes
- More educated buyers
- 'Power-house' marketing
- Materials changes/substitution

- Population migration south/west
- Increased "do-it-yourself"
- Smarter-WIRED homes
- Recognition of the importance of moisture control
- More objective-based codes
- Higher density land use

## ● CUSTOMER NEEDS

- End user-builder-whole chain & it may be changing
- Life cycle product stewardship is becoming an emerging issue
- Flexible housing in response to users changing needs
- Healthy environment & safe & comfortable
- Multiple uses for buildings (office, entertainment, etc)
- Need for education, way for mass of information to become meaningful
- Affordability & cost effectiveness!
- Consumers want to know-
  - "How do I get it done?"
  - "How do I get it done right?"
- Needs are geography-based: manufacturers, installation, practices

## ● UNCERTAINTIES

- Awareness "cost of" natural disaster
- Influence of human rights-liability
- Regulation by government
- Political uncertainties
- Climate change
- Economy
- Climate of legal system
- Energy supply
- Source/mode of energy supply
- Materials/sources price increases
- Lack of an industry
- Environmental impacts
- Ability of natural resources to sustain us
- E-Commerce impacts
- Globalization of markets
- Labor availability
- Foreign purchase US firms
- Influence "high quality" purchasing
- Utility deregulation
- ALL ROLES in SUPPLY CHAIN to sustain us

# Building Envelope Cover Story Vision



## ● BRAINSTORMS

- Builders Build Homes in 30 Days
- Old & New Finally Meet
  - Integration driven by design
  - Adaptable/Flexible
- Cost replaced by Value

## ● QUOTES

“The People have spoken, the Envelope is the KEY.”  
- President Ventura

“Home Heat Thyself” - Vice President Jackson

“Old Homes Better than New.” - HUD Secretary Bob Villa

“Last Fossil Plant Closed.” -DOE Secretary Robert Redford

“Power Plant in Each House- No Pollution.”  
-EPA Secretary Jane Fonda

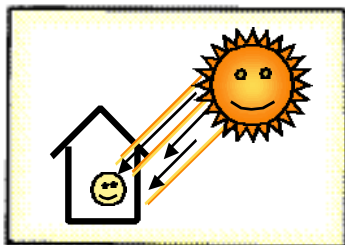
## ● BIG HEADLINES

- DOE Report - Global Warming Ends- Envelope Credited
- Envelope Changes with the Weather
- Envelope Problems Licked!
- Last Building Code Repealed: Voluntary, Market-Driven
- Andrew II Hits- No Homes Lost!
- “We LOVE this Stuff! Why did it take so long?” Builders relent

## ● SIDEBARS

- SMART HOMES = No Monthly Operation Bill
- Walls Provide Light
- Amazon.com sells 1 millionth Home
- Industry Innovation - Convertible Homes
- PATH Goals MET
- Envelope Fits Like a Glove

## ● IMAGES

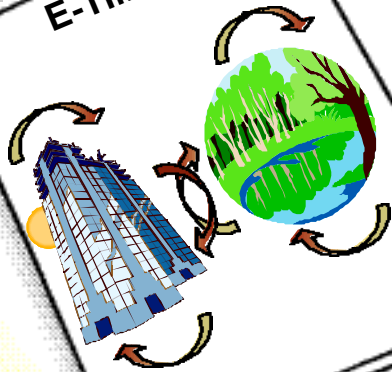


Vision Graphics Template:

©1996 The Grove Consultants International  
Content: © April 2000 BETR Working Group

# Building Envelope Cover Story Vision

## COVER E-TIME



## BRAINSTORMS

- E-House
- Self-Assembly
- Reduced Auto Use
- Adaptive Re-Use of Existing Buildings

## QUOTES

Safe House:

- "I love my home!"
- "Neither flood, nor fire, nor hurricane..."



- Neighborhood-Scale WW treatment
- Closed system
- Energy self-sufficient

## BIG HEADLINES

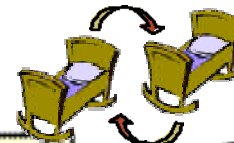
- "Money Pit" is \$ Maker
- So much energy, so little demand: power companies close
- Your own home get-away

- Adjust space as needed
- Yours today, your children's tomorrow
- The last house you'll ever want
- Your first and last house

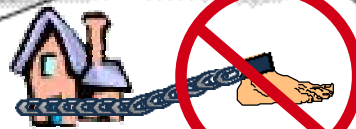
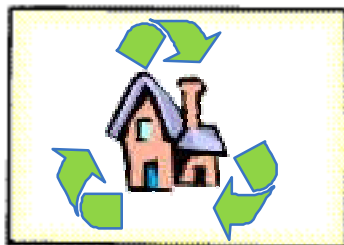
## SIDEBARS

- One Million Zero Energy, Thinking Houses Built!
- Low Maintenance
- Cradle to cradle

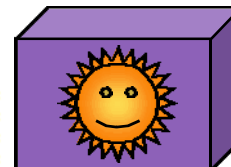
- Regenerative
- Waste in- energy out
- Zero waste
- No energy waste



## IMAGES



- Free time
- Low/no cost maintenance



The house IS the bubble

Vision Graphics Template:

©1996 The Grove Consultants International

Content: © April 2000 BETR Working Group



# Building Envelope Cover Story Vision

## COVER Your NewScreen

Turning  
the  
Tables

Pay to the  
Order of

20

Dollars

Signed

Home Pays College Education

## IMAGES



Houses disassembled & reused

All on site

## BRAINSTORMS

- Energy follows people
- Lighting follows people
- Self-contained buildings
  - H2O source
  - H2O reuse
  - Final residue disposal
- Wall function include security & Privacy
- Retrofit
- Modular
- Financing

## QUOTES

- President Melinda Gates says-  
“We’re winning the battle with climate change and building envelope industry is our trump card.”
- “Building Envelope Components Overtake Pork Bellies.” - WSJ

## BIG HEADLINES

- Home Repo- houses disassembled & moved as jobs move
- Buildings power themselves- Electric Grid Eased
- Power infrastructure financed via mortgages
- Houses are self-financed & energy now exported
- Independent code officials inspect homes consistently, responsive to regional differences and climate
- Your house Powers your car - solar, batteries, fuel cells, come into their own in carefully designed, tight houses
- Envelopes within envelopes interact to work better, smarter

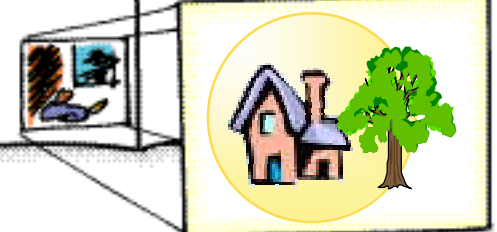
## SIDEBARS

- Our house is guaranteed for life!
- New windowless walls- LCD allows you to see anywhere, anytime
- Office becomes home centerpiece
- Insurance/service/ maintenance bundlers handle costs to homeowners of natural disasters

- Integrated products & integrated systems working to regulate houses & generate energy
- Remember the old days before integrated building envelopes regulated the weather surrounding them?



Home charges auto



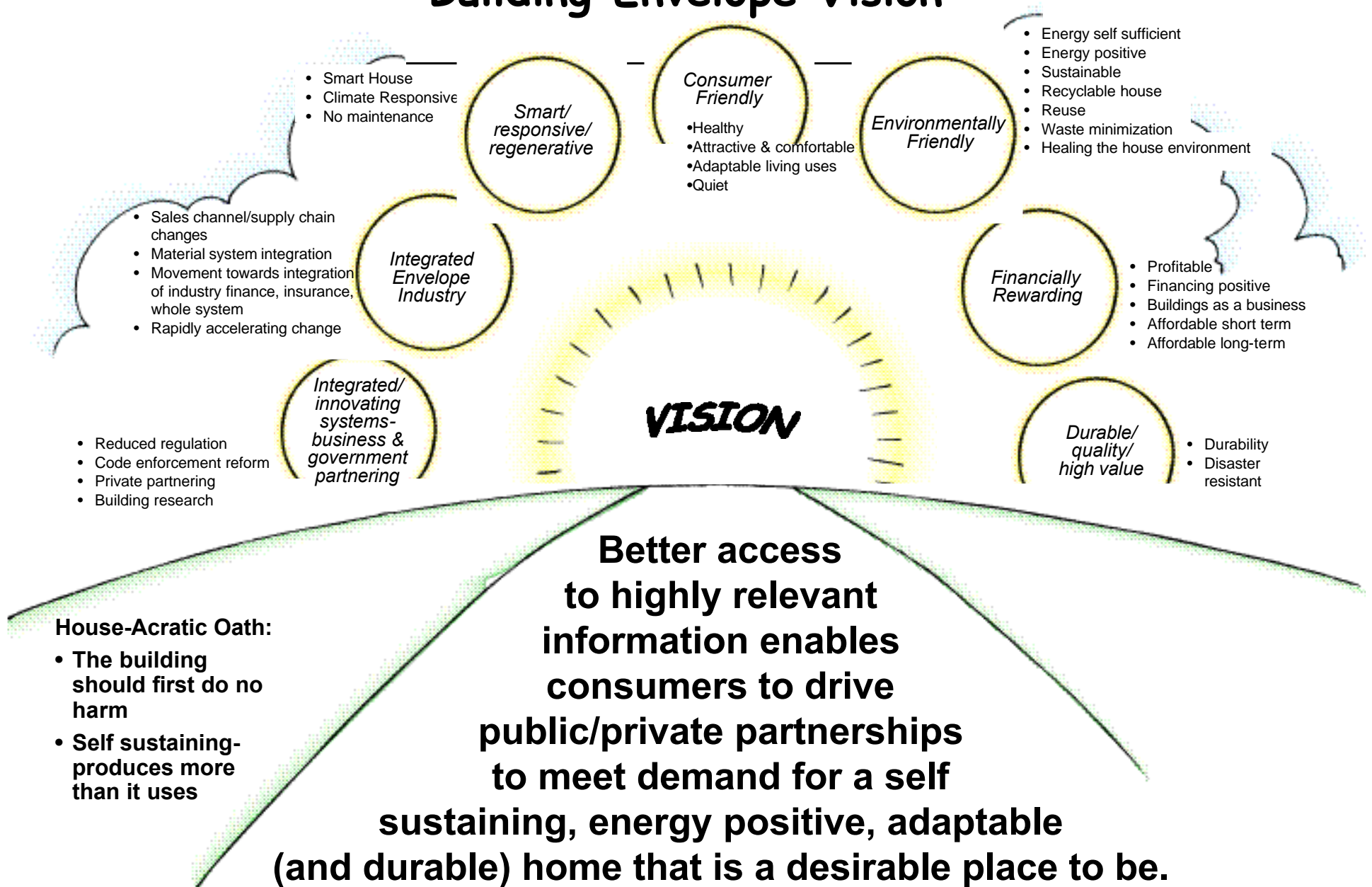
Envelopes provide different zones

Vision Graphics Template:

©1996 The Grove Consultants International

Content: © April 2000 BETR Working Group

# Building Envelope Vision

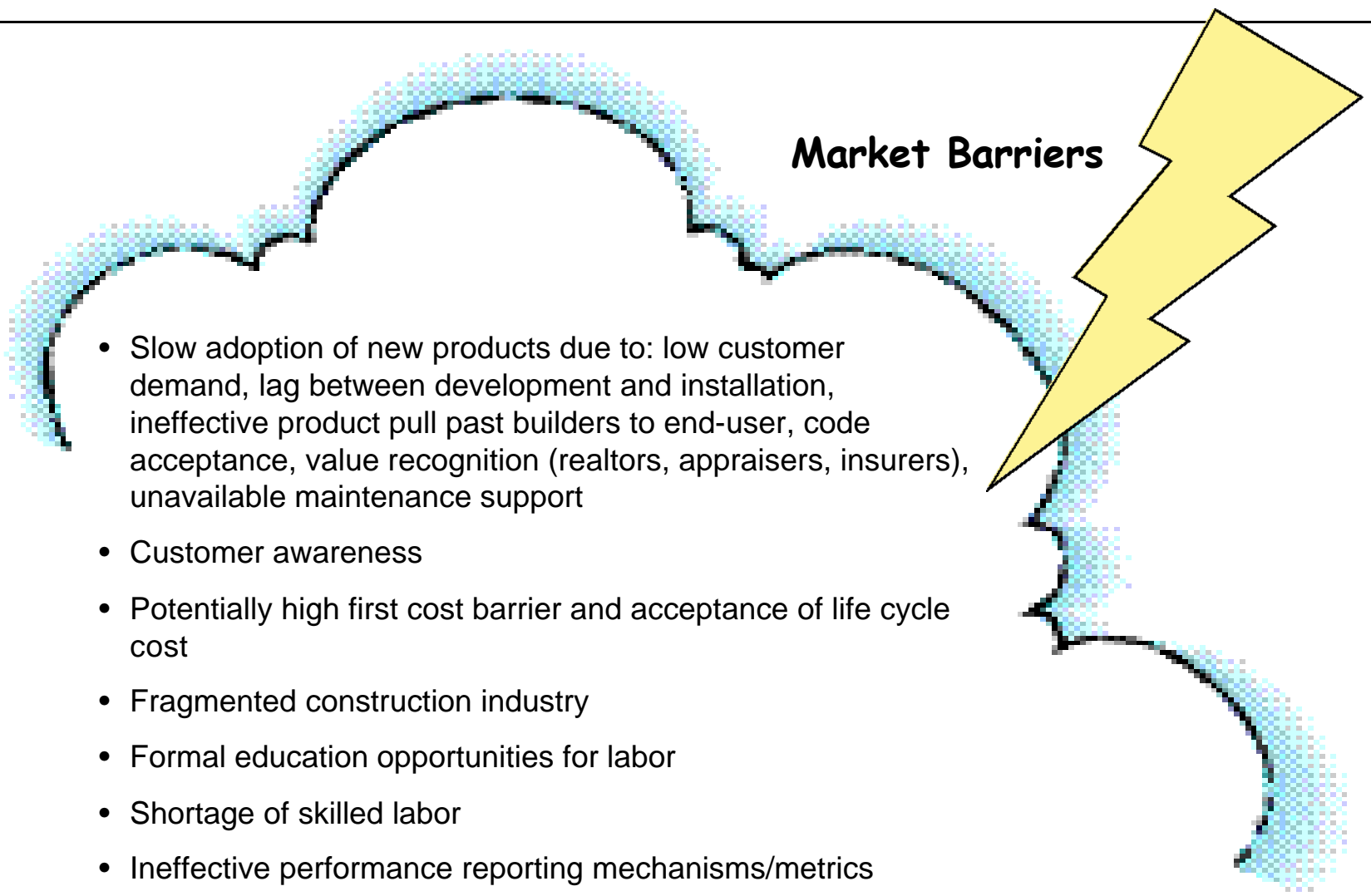




# Building Envelope Vision Barriers

---

## Market Barriers

- 
- Slow adoption of new products due to: low customer demand, lag between development and installation, ineffective product pull past builders to end-user, code acceptance, value recognition (realtors, appraisers, insurers), unavailable maintenance support
  - Customer awareness
  - Potentially high first cost barrier and acceptance of life cycle cost
  - Fragmented construction industry
  - Formal education opportunities for labor
  - Shortage of skilled labor
  - Ineffective performance reporting mechanisms/metrics
  - Changing demographics
  - Increase in product failure litigation (manufacturers and builders response to it)

# Building Envelope Vision Barriers

---

## Technology Barriers

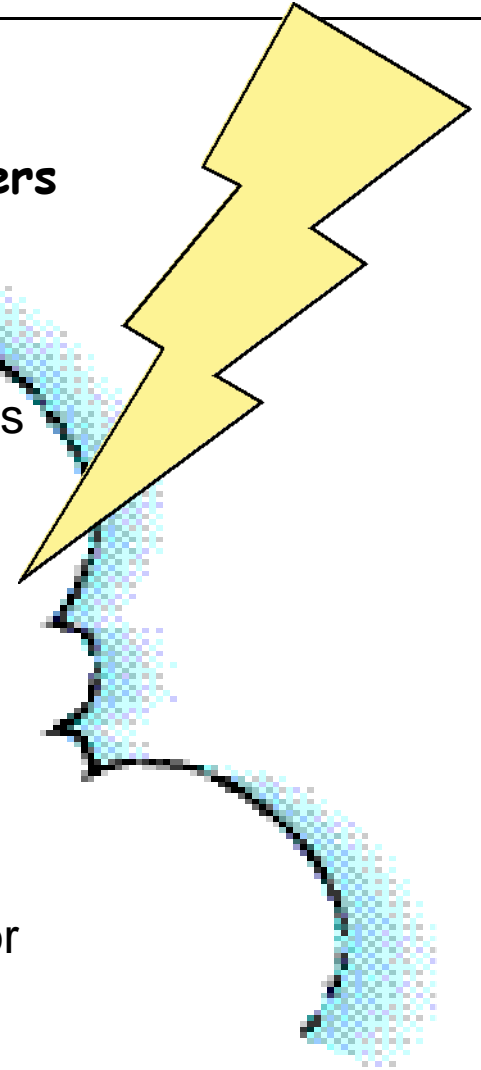
- Costs associated with research and development
- Large number of products in wall/envelope
- Varying industry manufacturing/assembly processes
- Simplistic performance criteria and incomplete performance measurement
- Raw material availability/durability

# Building Envelope Vision Barriers

---

## Policy Barriers

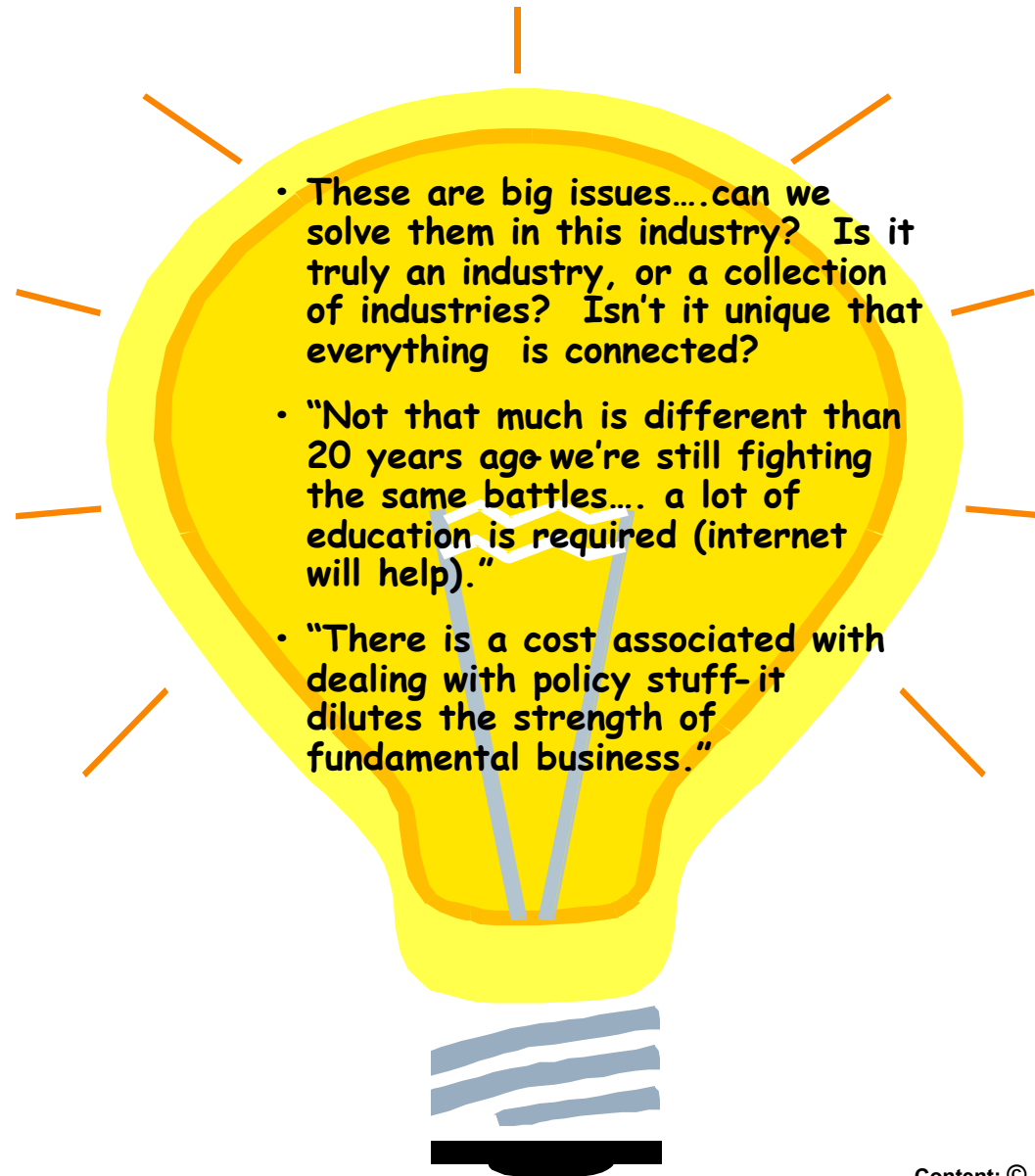
- Acceptance of new technology by building codes and officials
- Energy regulation/deregulation (state/federal, and generation/demand promotion)
- Patent proliferation
- Difficult for industry to consolidate (anti-trust laws, union resistance to integration)
- Concept of what is “being owned”-- who pays for benefit Vs. who receives the benefits - taxation incentives





# Participant Insights from Building Envelope Vision Barriers

---



# How should we complete the roadmap?

## Questions:

- How do you want to be involved?
- Is there a precedent for intra-industry collaboration?
- Is there enough collective benefit towards your working together?
- A lot of people are here with two hats: one as an interested individual and one as a company employee.

## Participants Responses

- The coalition for energy efficient homes is the closest thing to working toward a common goal.
- HUD funded a project to similar to the DOE project "Building America \* " Its not really clear how to work better together.
- A program like energy star has set a precedent for industry and DOE working together.... The whole house should be labeled (not just individual products).
- Our welfare is tied to the welfare of the whole system.

*Roadmaps, that are industry driven, will provide the framework for developing and deploying DOE's Building Research budget. This will lead a "new and competitive way of doing business." --Ron Santoro*

## Action Points

- Meeting Notes/  
Preliminary Results - 1st  
Draft Vision Document  
2/27
- Next Meeting Date -  
May, June (possibly  
coordinating with  
BETEC)
- Recommendations on  
additional participants to  
fry.kathryn@adlittle.com

\* "Building America is a private/public partnership that provides energy solutions for production housing. The Building America Program combines the knowledge and resources of industry leaders with the U.S. Department of Energy's technical capabilities to act as a catalyst for change in the home building industry." [http://www.eren.doe.gov/buildings/building\\_america/whatwedo.shtml](http://www.eren.doe.gov/buildings/building_america/whatwedo.shtml)